NASA STTR 2008 Phase I Solicitation

T2   Atmospheric Flight Research of Advanced Technologies and Vehicle Concepts

T2 Atmospheric Flight Research of Advanced Technologies and Vehicle Concepts Flight Research separates "the real from the imagined" and makes known the "overlooked and the unexpected." NASA's flight research mission is to prove unique and novel concepts through discoveries in flight. The chief areas of research interests encompass aerospace flight research and technology integration; validation of space exploration concepts; and airborne sensing and science. This topic solicits innovative proposals that would advance aerospace technologies for the nation in all flight regimes.

Subtopics

T2.01 Foundational Research for Aeronautics Experimental Capabilities

Lead Center: AFRC

This subtopic is intended to solicit innovative technologies that enhance flight research competences at DFRC by advancing capabilities for in-flight experimentation and for the supporting test facilities in the following areas:

- Methods and associated technologies for conducting flight research and acquiring test information from experiments in flight.
- Numerical techniques for the planning, analysis and validation of flight test experimentation conditions through simulation, modeling, control, or test information assessment.

The emphasis of this subtopic is proving feasibility, developing, and maturing technologies for advanced flight research experimentation that demonstrate new methodologies, technologies, and concepts (or new applications of existing approaches). It seeks advancements that promise significant gains in Dryden's flight research capabilities or addresses barriers to measurements, operations, safety, and cost. Proposals that demonstrate and confirm reliable application of concepts and technologies suitable for flight research and the test environment are a high priority.

Proposals in any of these areas will be considered:

Measurement techniques are needed to acquire aerodynamic, structural, flight control, and propulsion system performance characteristics in-flight and to safely expand the flight envelope of aerospace vehicles. The goals are to improve the effectiveness of flight-testing by simplifying and minimizing sensor installation, measuring new parameters, improving the quality of measurements, minimizing the disturbance to the measured parameter from the sensor presence. Sensors and systems are required to have fast response, low volume, minimal intrusion, and high accuracy and reliability.

Safer and more efficient design of advanced aerospace vehicles requires advancement in current predictive design and analysis tools. The goal is to develop more efficient software tools for predicting and understanding the response of an airframe under the simultaneous influences of structural dynamics, thermal dynamics, steady and unsteady aerodynamics, and the control system to increase understanding of the complex interactions between the vehicle dynamics and subsystems. Proposals for novel multidisciplinary nonlinear dynamic systems modeling, identification, and simulation for control objectives are encouraged. Control objectives include feasible and realistic boundary layer and laminar flow control, aero-elastic maneuver performance and load control (including smart actuation and active aero-structural concepts), autonomous health monitoring for improved stability, safety, performance, and drag minimization for high efficiency and extended range capability. Proposals are encouraged that advocate technologies or methodologies that enable real-time location independent collaboration from experimenters from both domestic and international organizations. This approach holds the promise of increasing effectiveness, reducing cost, and adding significant value to the experimental results.

This topic solicits proposals for improvements in all flight regimes - particularly transonic and hypersonic.